

# UNITED STATES SIGNAL SERVICE

# MONTHLY WEATHER REVIEW.

VOL. XVIII.

WASHINGTON CITY, OCTOBER, 1890.

No. 10.

## ○ INTRODUCTION.

This REVIEW is based on reports for October, 1890, from 2,319 regular and voluntary observers. These reports are classified as follows: 166 reports from Signal Service stations; 118 reports from United States Army post surgeons; 1,512 monthly reports from state weather service and voluntary observers; 32 reports from Canadian stations; 166 reports through the Central Pacific Railway Company; 325 marine reports through the co-operation of the Hydrographic Office, Navy Department; marine reports through the "New York Herald Weather Ser-

vice;" monthly weather reports from the local weather services of Alabama, Arkansas, Colorado, Illinois, Indiana, Iowa, Weather and Crop Service, Kansas, Kentucky, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Meteorological Report of the Missouri State Board of Agriculture, Nebraska, Nevada, New England, New Jersey, New York, North Carolina, North and South Dakota, Ohio, Oregon, Pennsylvania, South Carolina, Tennessee, Texas, and Wisconsin, and international simultaneous observations. Trustworthy newspaper extracts and special reports have also been used.

## ○ CHARACTERISTICS OF THE WEATHER FOR OCTOBER, 1890.

The month was warmer than the average October over the northern part of the country east of the valley of the Columbia River, along the Pacific coast south of the 40th parallel, over the southwest part of the plateau region, on the southeast slope of the Rocky Mountains, in the lower Rio Grande valley, and in southern Florida; elsewhere the month was cooler than usual. The greatest departure above the average temperature for October occurred in Manitoba and on the south Pacific coast, where it exceeded 4°, and the most marked departure below the average was noted over the interior of Alabama and Georgia, and in east Tennessee, where it equalled or exceeded 3°. At Los Angeles, Cal., the mean temperature was 1° 5 higher than previously reported for October. The highest temperature reported by a regular station of the Signal Service was 99° at Los Angeles, Cal., and by a voluntary observer, 118°, at Merced, Cal. At Galveston, Tex., the maximum temperature was 2° higher than previously reported for October. The lowest temperature reported by a regular station of the Signal Service was 14° at Huron, S. Dak., and by a voluntary observer, -10°, at Breckenridge, Colo. At Key West, Fla., the minimum temperature was 1° lower than previously reported for October. Killing frost occurred on the middle Atlantic coast from New Jersey northward, in the interior of the Gulf States, in central New Mexico and southeast Arizona, in eastern California, and along the Oregon and Washington coasts.

The heaviest precipitation ever reported for October occurred at stations in eastern Massachusetts, central and northeastern Pennsylvania, western Maryland, extreme western Florida, south-central Louisiana, east-central lower Michigan, northwestern North Dakota, north-central Montana, and southwestern Arizona. The least precipitation ever reported for October occurred in north-central Kansas, west-central Texas, east-central Washington, and at San Francisco, Cal. The greatest excess above the average precipitation for October was reported on the southeast New England coast, where it exceeded 6.00 inches; in extreme northwestern Washington and the adjoining part of British Columbia the excess varied from 4.00 to nearly 6.00 inches; in east-central Texas it exceeded 5.00 inches; in extreme western Florida 4.00 inches; and in north-

east Iowa, at Rio Grande City, Tex., and on Prince Edward Island, Gulf of Saint Lawrence, 3.00 inches. The most marked deficiency in monthly precipitation occurred at Key West, Fla., where it was nearly 4.00 inches, and the deficiency was more than 2.00 at Eastport, Me., Quebec, on the North Carolina coast, at Springfield, Ill., and Escanaba, Mich. In the east Gulf states, New England, and the lower lake region the precipitation was two-thirds to three-fourths greater, and in the middle Atlantic states it was about one-half greater than the average. At Key West, Fla., about one-third, at Spokane Falls, Wash., about one-half, and on the middle-eastern slope of the Rocky Mountains, and in the Missouri valley, two-thirds to three-fourths of the usual amount of precipitation was reported. Reports from California indicate some damage to raisin grapes by the rain of the last few days of September. Monthly snowfall exceeding 20.0 inches was reported at elevated stations in central Colorado, and at Virginia City, Mont.; 2.0 to 7.0 inches fell along the line of the Central Pacific Railroad crossing the Sierra Nevada Mountains; 6.0 to 8.0 inches in northeastern lower Idaho; 2.0 to 5.0 inches in central and western Nevada; 5.0 inches in southwestern Nebraska; 8.0 inches in extreme northwestern Minnesota; more than 10.0 inches in north-central upper Michigan; 11.0 inches in extreme western New York; 8.0 to 11.0 inches in south-central Pennsylvania; and 8.0 inches in northeast West Virginia.

On the 16th a tornado moved northeastward from near Hasty, N. C., to northwest of Maxton, and thence passed to a point a few miles northeast of Floral College, N. C., where it disappeared. During the passage of this storm one person was killed and several were injured. The damage to houses was about \$1,000, and to crops about \$1,000. Destructive general storms occurred on the Gulf of Saint Lawrence on the 5th and 6th; on the upper lakes from the 12th to 14th; along the middle Atlantic and New England coasts and on the lower lakes on the 17th; on Lake Michigan on the 18th; in southeast New York and along the south New England coast on the 19th; over Chesapeake Bay and along the middle Atlantic coast on the 23d; on the middle Atlantic and New England coasts, 24th; and on the south New England coast, 24th and 25th.

Widely observed auroral displays were observed on the 17th,

when auroras were reported from New England to the Dakotas, and southward to the Ohio Valley. Considerable damage was caused in West Virginia about the middle of the month by freshets in the Monongahela and Little Kanawha rivers and tributaries. A freshet was reported in the Wyoming Valley in the Susquehanna River basin, Pennsylvania, on the 26th.

On the 29th the Cape Fear River flooded its banks near Wilmington, N. C. Very dry weather was reported in parts of Nebraska, Kansas, Missouri, South Dakota, and south Minnesota. Destructive prairie fires occurred along the Cannon Ball, Heart, and Knife rivers, North Dakota, during the first part of the month.

## 0 ATMOSPHERIC PRESSURE (expressed in inches and hundredths).

The distribution of mean atmospheric pressure for October, 1890, as determined from observations taken daily at 8 a. m. and 8 p. m. (75th meridian time), is shown on chart II by isobars. The departure of the mean pressure for October, 1890, obtained from observations taken twice daily at the hours named, from that determined from hourly observations, varied at the stations named below, as follows:

| Station.          | Departure. | Station.                | Departure. |
|-------------------|------------|-------------------------|------------|
| Eastport, Me.     | + .008     | Duluth, Minn.           | + .004     |
| Boston, Mass.     | + .012     | Memphis, Tenn.          | + .002     |
| New York City     | + .010     | New Orleans, La.        | + .004     |
| Philadelphia, Pa. | + .015     | Saint Louis, Mo.        | — .000     |
| Washington City.  | + .012     | Santa Fe, N. Mex.       | — .007     |
| Savannah, Ga.     | + .014     | Denver, Colo.           | — .002     |
| Buffalo, N. Y.    | + .010     | Fort Assiniboine, Mont. | — .006     |
| Detroit, Mich.    | + .011     | Salt Lake City, Utah    | — .006     |
| Chicago, Ill.     | + .008     | San Francisco, Cal.     | — .018     |
| Cincinnati, Ohio. | + .008     | San Diego, Cal.         | — .015     |

The mean pressure was highest over Oregon and thence southeastward over north Nevada and northwest Utah, where it was above 30.10, and the mean values were above 30.05 over Mississippi and thence northeastward over east Tennessee. The mean pressure was lowest over east Nova Scotia and Cape Breton Island, where it was below 29.80, and was below 29.90 over a greater part of New England, in the lower Saint Lawrence valley, in the British Possessions north of Minnesota and North Dakota, and in the lower Colorado valley.

A comparison of the pressure chart for October with that of the preceding month shows a decrease in mean pressure in districts east of the Rocky Mountains and north of the Gulf States, the decrease being most marked at stations in

southeast New England and Nova Scotia, where the mean pressure was more than .25 lower than for September. Over the Rocky Mountain and plateau regions and on the Pacific coast, the mean pressure was higher than for the preceding month, the most marked increase being noted at stations in north California and Oregon, and thence eastward over the west part of the middle and the south part of the northern plateau regions, where it was more than .10. The area of high pressure which extended from the upper Mississippi valley eastward to the Atlantic coast in September had disappeared in October, and there had been a decrease of .15 to .25 in that region. The area of high pressure whose eastern limit touched the north Pacific coast in September had extended eastward and southeastward over the plateau region in October, with an increase in mean pressure of .05 to .10. An increase of about .05 occurred in the lower Colorado valley, while in the British Possessions north of Minnesota and North Dakota the decrease in mean pressure was more than .10.

The mean pressure was below the normal, save over extreme southern Florida, and on the Pacific coast north of the 40th parallel and thence eastward and southeastward over the northern and middle plateau regions. The greatest departures below the normal pressure occurred in Nova Scotia and on the extreme south New England coast, where they exceeded .20, whence the deficiencies became gradually less marked southward to Florida and westward to the plateau region. In the regions referred to where the mean pressure was above the normal the departures were less than .05.

The monthly barometric ranges at regular stations of the Signal Service are shown in the table of Signal Service data on the last two pages of the REVIEW.

Tabulated statement showing principal characteristics of areas of high and low pressure.

| Barometer.  | First observed. |         |          | Last observed. |          | Duration. | Velocity per hour. | Maximum pressure change and maximum abnormal temperature change in twelve hours and maximum wind velocity. |       |       |                         |       |       |                             |            |                 |       |    |  |
|-------------|-----------------|---------|----------|----------------|----------|-----------|--------------------|--|-------|-------|-------------------------|-------|-------|-----------------------------|------------|-----------------|-------|----|--|
|             | Date.           | Lat. N. | Long. W. | Lat. N.        | Long. W. |           |                    | Station.   | Rise. | Date. | Station.                | Fall. | Date. | Station.                    | Direction. | Miles per hour. | Date. |    |  |
| High areas. |                 | °       | °        | °              | °        | Days.     | Miles.             |  | Inch. |       |                         | °     |       |                             |            |                 |       |    |  |
| I.          | 1               | 45      | 73       | 42             | 68       | 2.0       | 9                  | Sydney, C. B. I.   | .24   | 1     | Montreal, Quebec        | 7     | 1     | Atlantic City, N. J.        | se.        | 26              |       | 3  |  |
| II.         | 1               | 42      | 127      | 40             | 113      | 4.0       | 12                 | Cheyenne, Wyo.   | .30   | 3     | Calgary, N. W. T.       | 26    | 2     | Fort Canby, Wash.           | sw.        | 48              |       | 4  |  |
| III.        | 6               | 43      | 129      | 50             | 93       | 4.5       | 22                 | Edmonton, N. W. T.   | .42   | 8,9   | Cheyenne, Wyo.          | 22    | 7     | Helena, Mont.               | ne.        | 40              |       | 8  |  |
| IV.         | 8               | 52      | 80       | 43             | 72       | 1.5       | 22                 | Winnipeg, Man.   | .28   | 8     | Father Point, Quebec    | 8     | 9     | Anticosti Island, G. St. L. | nw.        | 26              |       | 8  |  |
| IVa.        | 7               | 36      | 80       | 33             | 82       | 4.5       | 13                 | Parry Sound, Ont.  | .28   | 8     | Atlanta, Ga.            | 16    | 7     | Pensacola, Fla.             | ne.        | 26              |       | 9  |  |
| V.          | 12              | 44      | 123      | 38             | 70       | 4.0       | 37                 | Baltimore, Md.   | .38   | 13    | Dubuque, Iowa.          | 24    | 13    | Valentine, Nebr.            | nw.        | 48              |       | 13 |  |
| VI.         | 14              | 45      | 130      | 34             | 81       | 4.0       | 35                 | Dubuque, Iowa.   | .50   | 18    | Nashville, Tenn.        | 16    | 16    | Cheyenne, Wyo.              | w.         | 42              |       | 16 |  |
| VII.        | 17              | 44      | 110      | 47             | 65       | 6.5       | 22                 | Yarmouth, N. S.  | .40   | 18    | Pueblo, Colo.           | 19    | 18    | North Platte, Nebr.         | nw.        | 36              |       | 17 |  |
| VIII.       | 19              | 42      | 127      | 40             | 104      | 2.5       | 27                 | Pueblo, Colo.  | .44   | 20    | Denver, Colo.           | 21    | 20    | Helena, Mont.               | w.         | 36              |       | 20 |  |
| IX.         | 24              | 45      | 125      | 27             | 94       | 4.0       | 30                 | Medicine Hat, N. W. T.   | .36   | 25    | North Platte, Nebr.     | 16    | 25    | Chicago, Ill.               | ne.        | 44              |       | 26 |  |
| X.          | 27              | 46      | 116      | 34             | 90       | 4.5       | 22                 | Qu'Appelle, N. W. T.   | .40   | 29    | Mobile, Ala.            | 19    | 31    | Atlanta, Ga.                | w.         | 44              |       | 28 |  |
|             |                 |         |          |                |          |           |                    | Parkersburgh, W. Va.   | .36   |       |                         | 18    |       | Valentine, Nebr.            | w.         | 44              |       | 28 |  |
| Mean.       |                 |         |          |                |          | 3.8       | 23                 |  |       |       |                         |       |       |                             |            | 38              |       |    |  |
| Low areas.  |                 |         |          |                |          |           |                    |  | Fall. |       |                         | Rise. |       |                             |            |                 |       |    |  |
| I.          | 1               | 55      | 107      | 53             | 99       | 3.0       | 8                  | Calgary, N. W. T.  | .32   | 2     | Calgary, N. W. T.       | 26    | 2     | Rapid City, S. Dak.         | n.         | 38              |       | 3  |  |
| II.         | 4               | 49      | 75       | 47             | 57       | 1.5       | 28                 | Halifax, N. S.   | .34   | 5     | Rockliffe, Ont.         | 4     | 4     | Anticosti Island, G. St. L. | ne.        | 40              |       | 4  |  |
| III.        | 5               | 38      | 97       | 46             | 73       | 4.0       | 16                 | Keokuk, Iowa   | .24   | 5     | Pueblo, Colo.           | 15    | 5     | Grand Haven, Mich.          | ne.        | 36              |       | 6  |  |
| IIIa.       | 7               | 33      | 74       | 40             | 70       | 0.5       | 25                 | Nantucket, Mass.   | .06   | 7     | Portland, Oregon.       | 6     | 8     | Block Island, R. I.         | e.         | 36              |       | 7  |  |
| IV.         | 6               | 52      | 117      | 45             | 59       | 5.5       | 27                 | Edmonton, N. W. T.   | .50   | 6     | Concordia, Kans.        | 23    | 7     | Cheyenne, Wyo.              | w.         | 48              |       | 7  |  |
| V.          | 7               | 33      | 115      | 54             | 90       | 7.0       | 14                 | White River, Ont.  | .50   | 13    | Cheyenne, Wyo.          | 18    | 10    | Chicago, Ill.               | sw.        | 48              |       | 13 |  |
| VI.         | 15              | 38      | 99       | 44             | 60       | 3.0       | 32                 | Boston, Mass.  | .68   | 17    | Charleston, S. C.       | 16    | 16    | Block Island, R. I.         | se.        | 56              |       | 17 |  |
| VII.        | 17              | 42      | 98       | 43             | 63       | 3.5       | 26                 | Yarmouth, N. S.  | .48   | 20    | Denver, Colo.           | 15    | 17    | Boston, Mass.               | ne.        | 56              |       | 19 |  |
| VIII.       | 18              | 48      | 130      | 48             | 101      | 2.0       | 33                 | Calgary, N. W. T.  | .34   | 18    | Helena, Mont.           | 20    | 18    | Fort Canby, Wash.           | se.        | 72              |       | 18 |  |
| VIIIa.      | 20              | 38      | 100      | 44             | 59       | 6.0       | 24                 | Baltimore, Md.   | .44   | 23    | Pueblo, Colo.           | 23    | 19    | Block Island, R. I.         | ne.        | 80              |       | 25 |  |
| IX.         | 20              | 51      | 117      | 50             | 86       | 3.0       | 24                 | Minnedosa, Man.  | .34   | 21    | Fort Assiniboine, Mont. | 17    | 21    | Fort Assiniboine, Mont.     | sw.        | 46              |       | 21 |  |
| X.          | 26              | 36      | 70       | 48             | 62       | 1.5       | 30                 | Halifax, N. S.   | .62   | 27    | Albany, N. Y.           | 9     | 27    | Nantucket, Mass.            | ne.        | 56              |       | 27 |  |
| XI.         | 28              | 45      | 85       | 51             | 60       | 2.0       | 35                 | Keokuk, Iowa   | .40   | 28    | Rapid City, S. Dak.     | 20    | 28    | Norfolk, Va.                | nw.        | 46              |       | 29 |  |
| Mean.       |                 |         |          |                |          | 3.3       | 25                 |  | .40   |       |                         | 16    |       |                             |            | 51              |       |    |  |